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Integrated care for people with long-term mental and physical conditions in low- and middle-income countries: narrative review

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Summary

Integrated care is defined as health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector and, according to their needs, throughout the life course. This narrative review paper aims to describe the most relevant concepts and models of integrated care for people with chronic (or recurring) mental illness and comorbid physical health conditions, to assess the strength of evidence base for these models in high income countries (HICs) and in low- and middle-income countries (LMICs) through a conceptual overview and a structured narrative review, and to identify opportunities to further test the feasibility and impact of such integrated care models. The results of the review are presented in terms of; (i) the rationale for integrating care for people with mental disorders into chronic care; (ii) models of integrated care; (iii) evidence of the effects of integrating care in HICs and in LMICs; (iv) the key organisational challenges in LMICs to implement integrated chronic care; and (v) practical steps to realise a vision of integrated care in the future.

Background

The global pattern of the burden of disease is changing^{1 2}. Health care systems, which traditionally focused on acute care, now increasingly need also to address the challenge of providing care for people with chronic conditions. This offers an opportunity to integrate mental and physical health care to address the full range of health care needs of the whole person.

In terms of defining the key terms used here, ‘*chronic conditions*’ is used to refer to people with a range of disorders, either communicable or non-communicable (including HIV/AIDS, tuberculosis, cardiovascular disease or risk, cancer, diabetes, depression or alcohol use disorders), which are characterized by long duration (at least three months), remitting and recurring symptoms, and often by slow progression. Such chronic conditions often include comorbid physical and mental disorders.

In 2016 WHO released a bold vision for integrated care defining it as: ‘health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course’³.

The aims of this paper are to describe the most relevant concepts and models of integrated care for people both severe mental illness and co-occurring chronic physical conditions, to assess the strength of evidence base for these models in high income countries (HICs) and in low- and middle-income countries (LMICs) through a structured narrative review, and to identify priorities to further test the feasibility and impact of such integrated care models in LMICs in the future.

Conceptual overview

Rationale for integrating care for people with severe mental disorders into chronic care

The health and social consequences of long-term physical and mental disorders are increasingly recognized as major concerns for health, as well as for social and economic

development. There has been a dramatic improvement in life expectancy in most parts of the world in recent decades. Globally, life expectancy from birth increased from 61.7 years (95% uncertainty interval 61.4-61.9) in 1980 to 71.8 years (71.5-72.2) in 2015,⁴ reflecting the global transition from the burden of infectious diseases on public health to that of non-communicable diseases (NCDs).⁵ NCDs cause an estimated 36 million deaths (63% of the 57 million deaths that occurred globally in 2008), due mainly to cardiovascular diseases, cancers, and chronic respiratory diseases, mainly in LMICs. NCDs also place a heavy economic burden on countries, with the annual lost productivity attributable to depression and anxiety disorders worldwide, for example, estimated in 2013 to be US\$ 900 billion⁶. The costs of diabetes, for example, are projected to rise to at least US\$ 745 billion in 2030, with LMICs assuming a much greater share of these economic losses than HICs⁷.

The syndemics approach

There are multiple mechanisms which inter-connect co-morbid long-term mental, physical and cognitive disorders. People living with HIV/AIDS, for example, have a marked increase in the likelihood of becoming depressed, using alcohol, tobacco or other addictive substances, and are also at a higher risk for experiencing a cardiovascular event⁸. These reciprocal relationships mean that long-term physical and mental conditions share common disease determinants and consequences, and also bi-directional pathways, so that one type of morbidity may be both a determinant and or a consequence of another⁹ (see Figure 1).

The study of these commonalities among chronic conditions is increasingly referred to as ‘syndemics’¹⁰⁻¹², which is the study of large scale social, environmental and economic factors that promote disease concentration and interactions, or ‘disease clusters’.^{12,13}

As the field of syndemic research gathers pace it is now expanding to include the study of non-communicable diseases. An example is the interaction between diabetes and depression amongst Mexican immigrant women in Chicago, in the context of violence, isolation and abuse¹². Researchers are also applying the “syndemic lens” to disease concentration in low income countries. Weiser and colleagues, for example, present a

framework for understanding the acquisition of HIV/AIDS and the progression of this illness in communities, households and individuals threatened by poverty and malnourishment¹⁴. Food-insecurity, for instance, contributes to risky sexual practices and enhanced transmission of HIV. In contrast, large-scale social forces (such as migration to urban centres, reduction in manual work and increased consumption of convenience, processed high-calorie food) in some transitioning economies have led to an obesity crisis. This creates a complex interaction between metabolic syndrome and infectious chronic disease such as HIV/AIDS and tuberculosis – complicating the natural history and management of these conditions^{15,16}.

(Figure 1 about here)

Models of integrated care

At present, health systems worldwide are poorly organized to respond to the needs of people with NCDs and other long-term conditions, as they were mainly developed to respond to people in need of urgent or episodic care, usually with single health conditions¹⁷. Long-term conditions require alternative approaches. One such approach was initially articulated by Wagner et al as the ‘chronic care model’¹⁸. This was subsequently adapted for global application by the WHO as the Innovative Care for Chronic Conditions Framework (ICCCF)¹⁹. This framework recommends: (i) integration of care for people with multiple morbidities including mental and physical multi-morbid conditions; (ii) integration of mental health in primary/routine health care platforms for chronic conditions²⁰⁻²²; and (iii) integration of care of multiple members of the same household, as there is an emerging evidence base on the clustering of chronic conditions in the same household, which could be due to shared risk factors as well as the impact of a condition in one member on the health of others, such as dementia in one person and depression in the carer. The ICCCF model includes eight specific types of action, all of which are intended to be implemented to achieve the integration of care, as shown in Table 1.

(Table 1 about here)

Levels of integrated care

To help navigate through a wide-ranging set of concepts, it may be helpful to consider integrated care at three organisational levels: (i) *Macro* i.e. at the national level; (ii) *Meso* i.e. district or facility level integration activities such as the provision of comprehensive care at primary care facilities; and (iii) *Micro* i.e. individual, household, or local community level activities^{23, 24}. This chronic care model therefore sets out a number of the systemic changes which are thought to be necessary to achieve quality improvements in services for people with chronic conditions. These include: support of service users to manage themselves ('self-management support'); clear delineation of clinical roles and responsibilities; support of clinical decision-making through guidelines and tools; improved clinical information systems and service coordination; and collaboration with community groups²⁵.

The key issues at the *macro level* include the integration of activities at the policy or population levels, such as policy formation, budgetary allocation, and purchasing or payment. At the *meso level*, changes would occur within district, community or primary care facilities, which change the care pathway for people with long-term conditions²³. At the *micro level*, services include: targeting, goal setting, and planning, in which patients and providers focus on a specific problem, and together set realistic and measurable goals, and develop an action plan for attaining those goals in the context of patient preferences and readiness.

The outcomes of integrating care in high income countries

Evaluations of the impact of the integrated chronic care model have so far been largely limited to HICs, and have mostly reported at the patient level (micro), rather than facility/district (meso) level or whole system (macro) level outcomes²⁶, although there is emerging evidence that well integrated care can reduce overall health care spending²⁷. In assessing whether integrated care programmes have achieved their stated goals of reducing fragmentation, and improving continuity, coordination and outcomes of care, the overall findings are largely consistent and show that integrated chronic care models,

in high income settings, do indeed tend to produce improvements in quality of care²⁸ and in patient outcomes²⁹? The question of whether there is such evidence in LMICs is dealt with in the section below.

The majority of the studies concerned with mental-physical comorbidity have addressed people with common mental disorders (rather than severe mental illnesses) such as the TeamCare trial which evaluated a collaborative integrated care model for patients with diabetes and/or heart disease and depression in community-based primary care clinics in Washington State and demonstrated improved physical and mental health outcomes when compared to care as usual^{30-32 33}. In other similar studies, positive effects have been shown for people with depression^{34 35}, chronic obstructive pulmonary disease³⁵, asthma^{35 36}, diabetes^{35 36} and heart failure³⁶.

It is not clear whether all the components of the chronic care model are necessary, or whether some components are more effective than others³⁴. Research papers more often tend to report clinical level variables (such as information given to patients to support self-management) than to assess organisational factors, such as professional culture, governance, financial management, communication patterns, implementation readiness, or presence of supportive leadership³⁵. The economic outcomes reported are somewhat less consistent, but tend to show an overall positive impact on cost reduction³⁶. The overall quality of these intervention studies is moderately strong³⁷.

In relation to the application of integrated care for the treatment of people with common mental disorders, a systematic review published in 2014 showed that trials of collaborative care that include psychological treatment, with or without anti-depressant medication, appear to improve depression more than those without psychological treatment. Interventions that used systematic methods to identify patients with depression, and also trials that included patients with a chronic physical condition reported improved use of anti-depressant medication³⁸.

The impact of integrating care in low- and middle-income countries

Yet far less information is available on the application and the effectiveness of integrated care in LMICs. Where this has been implemented, intriguing lessons have emerged. For example, the need for clear staff roles and responsibilities within integrated clinical teams was identified as a potential barrier to effective care in a study in China³⁹. In South Africa, the chronic care model was shown to be feasible in primary care clinics only if there was a strong concurrent focus on health system strengthening, such as change management support for clinical staff and managers⁴⁰. But the model was shown not to be effective for people with depression when delivered using training of health providers alone, without resourcing the health system to expand access to anti-depressants or psychological treatments identified as an additional pre-requisite⁴¹. A review of chronic care programmes in the Philippines also showed that this approach is feasible, but only if certain conditions are met, namely: (i) incorporation of chronic care throughout the health system; (ii) acceptance by health care staff of these responsibilities, facilitated by task sharing; (iii) ensuring that patients receive education to support self-care; and (iv) using health promotion activities in the general population, with a strong focus upon co-morbidities⁴².

Within LMICs several studies have aimed to identify the active ingredients of the collaborative care model and, to date, the key elements for people with common mental disorders are: case screening, providing psychosocial treatments and adherence management; access to essential medicines; support of visiting psychiatrists, and active patient follow up^{43 32}. For people with severe mental disorders the key factors facilitating effectiveness are rather similar and include: psycho-education interventions; adherence management; rehabilitation; referral to community agencies; and health promotion⁴⁴.

Method

As we identified few review papers related to the effectiveness of chronic care models in LMICs in this conceptual overview, using World Bank Country Group criteria, we conducted a structured, narrative literature review to address the question: What is the

evidence from LMICs that implementing the chronic care model/ICCCF improves processes and clinical outcomes for people with long-term mental disorders and comorbid physical disorders, for family and household members, and for health service staff who provide care for patients? This review was carried out from July 2016 - February 2017, to identify evidence in peer-reviewed journals on the application and/or evaluation of integration of mental health care with services for people with long-term physical conditions.

Inclusion and exclusion criteria

The literature review inclusion criteria were the following. (i) Any publication that provided either a description or an evaluation of either the chronic care model, ICCCF model or integrated health care for chronic / long-term physical conditions and mental disorders. (ii) Only papers referring to LMICs were included. (iii) Only research papers in English were included. The exclusion criteria were: (i) research papers that did not provide either a description or a scientific evaluation for either the chronic care model, ICCCF model or for integrated health care for chronic / long-term physical conditions and mental disorders; (ii) papers referring only to high-income countries; (iii) papers with a primary focus only on chronic physical conditions; or (iv) conference abstracts. The search terms are given in Web Appendix 3.

Data extraction and review process

The review process consisted of the following steps. (i) Four researchers carried out the review, and three search engines were accessed, Medline, Embase and PsycInfo, using (terms describing chronic care or integrated care models) and (terms describing long-term mental health conditions or multiple chronic conditions) and (terms describing evaluation or research etc.) and (terms describing LMICs or developing countries), from inception to February 2017. (ii) Papers, book chapters and programme documents were assessed for inclusion, first through title and abstract screening, and subsequently through a full text review of those papers where relevance could not be established from the title or abstract, using the PRISMA checklist⁴⁵. This assessment was divided among two pairs of researchers. Where there was disagreement between the reviewers during full-text review, the decision of whether to include the report was independently made

by a third researcher. (iii) Further literature was searched for, including grey literature (e.g. books and non data-based papers), by hand-searching reference lists (for example in relevant reviews or journal papers); by using a snowballing process of contacting experts in the topic area; and by searching the internet (through Google and Google Scholar search engines, relevant organizational websites, and key journals). Two researchers reached consensus on whether resources identified from the grey literature were eligible for inclusion. (iv) Prior to commencement, a data extraction form was designed for use in the review. The inclusion criteria were any publication that provided either a descriptive or evaluative component, from an LMIC, written in English, referring to both severe mental illness and a comorbid chronic physical condition. Excluded papers did not provide either a descriptive or scientific evaluative component, were from high-income countries, focused on chronic physical conditions, were in languages other than English, or were conference abstracts. Full details of the method used for the review and the search strategy employed are set out in Web Appendices 1-3.

(Web Appendices 1-3 about here)

Results

Overall 1266 papers were identified from these databases, and Figure 2 shows the step-wise results of the search literature procedure. Once duplicates were removed, 910 articles were reviewed. Through snowballing and hand searching, 23 reports and book chapters were also identified. Hence a total of 933 papers, chapters and reports were selected for title abstract screening, from which 57 were selected for full-text review. A total of 21 papers (18 research papers and 3 book chapters) were included in the final review⁴⁶⁻⁶⁶ (see Web Appendix 4). The inter-rater reliability (kappa) between reviewers was 0.80. The excluded articles (n = 819) were mostly in the definite exclusion category (n=813), while some of them targeted physical chronic conditions only (n=38), some described low income groups within high income settings (n= 18) while other papers (n = 17) had a high-income country focus.

(Web Appendix 4 about here)

(Figure 2 about here)

Study design of reviewed papers

In terms of the study designs identified, of the 21 studies, two were randomised control trials, nine were cross-sectional studies, two were systematic reviews, and the remaining eight were descriptive/narrative reviews. Fifteen of the sources reported collected qualitative data, five quantitative data and one reported both. Only four papers reported outcomes from evaluations of integrated care for people with mental illnesses and long-term physical conditions. Of the studies, four were conducted in low-income countries (Pakistan, Zanzibar, Nepal, Ethiopia), five in lower-middle income countries (India, Kenya, Brazil, and Costa Rica) and two in upper-middle income countries (Jamaica, South Africa).

Integrated primary health care

A small majority of studies (13/21) focused on integrating mental health with other chronic physical conditions at primary care level, two emphasised integrating mental health with sustainable livelihood, and the rest highlighted integration of mental health with HIV, neurological disorders, malnutrition and cardiovascular diseases. Most studies were recent: eight were published between 2008 and 2012 and 13 between 2013 and 2017.

Overall, we identified some evidence in favour of the impact of integrated chronic care models, although the quality of the data was rather weak, as assessed using the Cochrane risk of bias tool⁶⁷, and only eight studies included an explicit evaluative component. Of these, two were high-quality randomised control trials. In one trial, 176 patients with long-term conditions were randomly assigned to receive usual care or collaborative care.

Effectiveness of clinician training

In a pragmatic cluster trial in South Africa, 38 primary care clinics were randomised to receive collaborative care training (called Primary Care 101, now renamed PACK), which was not shown to be effective on the primary outcomes of treatment intensification for hypertension, diabetes and chronic respiratory disease and on case detection of

depression. It did, however, show some important secondary effects including positive impacts on evidence-informed prescribing for diabetes (in those with moderately uncontrolled disease - baseline HBA1C between 7 and 10%) and cardiovascular risk (increased provision of statins to patients with high body mass index, increased provision of aspirin to those with diabetes). The authors noted that these trial findings assessing the effectiveness of complex interventions in real world settings, were difficult to interpret and noted several challenges including a co-intervention, called the Chronic Disease Season, triggered by the trial, and not expanding access to antidepressant prescribing or psychological therapies^{41 68}.

Social interventions

Several of the papers (5/21) identified the importance of including social interventions, such as collaboration with community groups, in treating people with comorbid conditions. In Sao Paulo in Brazil, for example, the Equilibrium programme delivered a cost-effective multi-dimensional bio-psycho-social intervention treatment to children with both mal-nourishment and mental illness⁶⁶. An adaptation of the ICCCF framework for evaluating the management of long term care for people with severe mental disorders in South Africa identified that poverty alleviation measures were an essential component of the intervention package⁶⁹. The BasicNeeds model, a social intervention that integrates employment with the care and treatment of mental disorders, is cost effective and accessible to community members particularly vulnerable due to their symptoms and poverty^{47 70}.

Screening and case identification

Does integrated care assist screening and case identification of people with long-term conditions? Four studies examined this question. In Pakistan integrated care was found to increase detection rates for diabetes mellitus, hypercholesterolemia, depression, osteoporosis and dementia in primary care⁵⁹. A South African study showed benefits of integrated care among people with HIV/AIDS⁵⁴, while further studies in India and Costa Rica also supported improved case detection rates of comorbid conditions^{57,64}.

Health system preparedness for integrated care

How prepared are LMIC health systems for integrated care? Several of the papers assessed this issue, in general finding low levels of preparedness⁵⁰. This often referred to the lack of multi-disciplinary teams within primary care^{58,61}, insufficient training for staff on the management of people with long-term conditions⁵⁷, insufficient capacity to provide long-term follow-up and make sure that people don't 'fall through the cracks', treatment inertia and limited efforts to 'treat to target'³³, poor understanding of integrated care by health insurers⁵⁷, insufficient or fragmented health information systems^{52,62}, or implementation without contextualising for the local health, spiritual and religious beliefs⁴⁶.

Stigma reduction

Integrated care has not been very substantially examined for any effect on stigma reduction, and the indirect evidence on this issue is conflicting. An innovative project in Jamaica suggested that integrating community mental health service provision within primary care improves public attitudes towards people with mental illness. Yet work in Zanzibar concluded that health sector reforms focus on communicable diseases, and that specialists in these fields were resistant to include mental health in these reforms⁵². Two important studies in South Africa found that integrated care, in particular shared waiting rooms for all people with chronic conditions, was reported by staff to reduce discrimination and to increase access to care among people with HIV/AIDS^{71,72}. The narrative review also identified additional methodological and content areas in which research on integrated care can usefully focus in future. Evaluations of cost-effectiveness are few in LMICs⁷³, as are methods to allow modelling to estimate future costs and benefits of integrated care^{74,75}.

Discussion

Key organisational challenges in LMICs to implement integrated chronic care

The findings from this narrative review of recent LMIC studies of integrated care are fully aligned with the results of our conceptual overview of this field. Both sources confirm that health systems are poorly configured to deal with chronic care needs, as has been shown by the recent Disease Control Priorities (DCP) mental health group⁷⁶. These key

findings can be presented according to the following WHO health systems ‘building blocks’¹⁹.

Governance barriers: The WHO describes governance as the steering and rule-making functions of governments and decision makers as they try to achieve health policy objectives⁷⁵. Good governance includes maintaining the strategic direction of policy development and implementation, detecting and correcting undesirable trends and distortions, articulating the case for health in national development, regulating the behavior of a wide range of actors ; establishing transparent and effective accountability mechanisms, managing donor assistance, and to collaborate across sectors to achieve better population health.

Barriers related to strategic direction of policy development and implementation include those shown in the box below, where these factors apply in many HICs and LMICs worldwide:

Barriers of coordination

- Poor coordination across levels of government (local, provincial, national)⁷⁷
- Lack of coordination at higher levels of leadership or management create collaboration difficulties at the local level.

Barriers of human resources and skill

- Insufficient professional capacity to translate policy into plans
- Scarcity of managerial staff to implement policies, along with technical support
- Long-term dependence on external technical expertise secondary to limited internal professional capacity

Inappropriate fit of policies

- Policies developed by external actors
- Lack of buy-in or lack of relevance of policies to local actors

Leadership and accountability

- Authoritarian leadership styles
- Lack of a culture of quality improvement
- Limited understanding of system-wide data and inaccurate reporting derail accountability mechanisms
- Lost opportunities for data-driven feedback and learning⁷⁸
- Lack of higher level commitment to mental health or competing priorities may limit or prohibit implementation of mental health laws and policies

Financing factors

- Donor funding may not be amenable to integration Differing streams of funding can make shared decisions and shared responsibility more challenging
- Related difficulties in working across different bureaucracies (e.g. health and mental health, health and social services, or health and criminal justice)

Multiple **financing factors** can also influence the possibility of service integration including: very low levels of investment in chronic conditions, alongside high reliance on out of pocket payments, with their consequent impoverishing effects; limited or low levels of investment in social health insurance; fragmentation of financing that accompanies vertical programming so that even in programmes that attempt to integrate, some services may be subsidized by donor funding (e.g. HIV/AIDS) and others are not only unsubsidized, but more expensive because of low demand (e.g. community mental health services). For example, in Vietnam, insurance will reimburse for service delivery attached to a specific setting, e.g. mental health services in a psychiatric setting, but not in primary care. Similarly, insurance may not cover services provided by a non-specialized provider. Coverage is designated to a specific care provide and the service delivery location.

Limited **human resources** and even more limited mental health human resources are both the rationale for, and a limitation upon, integrated care. Where few specialists are available to provide oversight of services, opportunities for training and supervision are limited. Strongly differentiated specialist competencies can lead to difficulties integrating care due to the challenge of coordinating care, communicating, and organizing shared care across different “jurisdictions”. A high level of turn-over of staff in parallel with the recruitment of well-trained mental health providers into non-clinical roles can lead to inefficient use of skills and maintains gaps in mental health coverage. In such cases leadership may not be adequately equipped to guide development of policies and planning for human resource capacity-building.

The **inertia of current patterns of service delivery** can also dampen innovation, such as the emphasis on in-patient care that remains predominant in many LMICs. There may be no organizational culture that values innovation or transformation of services, no culture for

quality improvement, or a lack leadership focused on staff development or change. There may also be very limited demand for more or better services, for reasons of poor mental health literacy or mental health related stigma⁷⁹.

Information systems are frequently unlinked, incomplete, with little quality assurance, low investment, poor information governance, and with few relevant or useful mental health indicators collected. In under-resourced systems, there can be a lack of coordination of what to collect across the system as well as lack of understanding of the relevance of data. Insufficient training of clinicians can also lead to poor quality data in information systems, thus giving available data limited utility. Yet another challenge for future information systems development will be the need to comply with new data protection regulations.

A vision for integrated chronic care for people with SMI in LMICs

For these reasons, a fundamental service transformation may be necessary in order to achieve an integrated system of care that empowers patients and providers, delivers a better quality of care, and brings about improved health, economic and social outcomes for people with chronic physical and mental conditions. A key outcome of this transformation would be continuity of care. . Continuity of care refers to the process by which a patient receives high-quality care over time, in terms of having an ongoing relationship with a health professional, which is well-integrated and coordinated across health staff and different service levels. This person-centric approach is at the heart of the integrated care model, which the WHO has defined as “The management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system” (WHO, technical brief No.1, p. 1); to which definition we would also add palliative care.

In this future vision, integrated care for people with chronic mental disorders and comorbid chronic physical conditions is expected to result in a range of improved outcomes: (i) at the system-, organizational- and provider-level (e.g. earlier identification and better access to care; enhanced staff clinical competencies; better management of

co-morbid chronic conditions; improved job satisfaction for service providers; improved efficiencies as a result of treating multiple co-morbidities at one service delivery point); (ii) for patients and their families (e.g. better access to care and better health outcomes for persons with chronic conditions; better patient social and economic outcomes; less stigma if treated in generic facilities; more satisfaction of service users with healthcare processes; greater participation in chronic health care by patients (self-management), family members and communities; improved efficiencies as a result of treating multiple co-morbidities at one service delivery point); and (iii) for health staff (e.g. improved job satisfaction for service providers; better staff morale and lower burnout levels). Nevertheless, evidence for integrated care is still scarce in LMICs, and particularly so for co-/multi-morbidities that include a mental disorder^{80,81}.

Integrated care programmes can also be assessed in terms of changes in the quality of care as defined by the Institute of Medicine, i.e. effective care which is patient-centric, timely, safe, efficient, accessible and equitable. The intended benefits of implementing integrated care are shown in Web Appendix 5. Rather than taking a disease-specific, ‘verticalised’ approach, such integrated care adopts a person-centric approach, providing access to care for both medical and mental disorders in one location where patients are comfortable receiving care, and continuity of services after initial diagnosis for as long as necessary⁸².

(Web Appendix 5 about here)

Practical steps for implementing integrated care

There are substantial *training implications* for such a new approach, including the large scale training of general health care staff in primary and community care health centres in the skills needed to identify and treat people with mental disorders, for example using the WHO PEN package for NCDs (http://www.who.int/ncds/management/pen_tools/en/), the mhGAP Intervention Guide for mental, neurological and substance use disorders⁸³⁻⁸⁵, guidelines for case management^{86,87}, or integrated primary care guidelines such as those in South Africa (called PACK), are practical tools for service integration at the provider⁸⁸.

Panel: The Practical Approach to Tool Kit (PACK) in South Africa

Practical Approach to Tool Kit (PACK): supporting the provision of universal integrated primary health care: PACK is an approach to support primary care providers working in resource-constrained settings to provide the most evidence-informed care feasible within numerous resource constraints (in terms of medications, investigations, skill and scope of practice) to the person sitting across from them. The Knowledge Translation Unit at the University of Cape Town has developed, implemented and evaluated it over a period of 18 years originally taking its lead from the WHO's Practical Approach to Lung Health. The central tool is a concise (120 page) clinical decision support aid comprising algorithms and checklists providing an approach to the 60 commonest symptoms and 27 chronic conditions among adults presenting to primary care in LMICs. It integrates content on communicable diseases, NCDs, mental disorders (including an adaptation of mhGAP), and women's health. PACK uses onsite, case-based, short training sessions in primary care teams to familiarise health workers with the clinical decision support tool and to support scalable implementation within a task-sharing approach. Four pragmatic randomised trials in South Africa involving 33,000 patients from 166 clinics have shown reproducible and substantial improvements in quality of care, health outcomes and health care utilisation mainly in the area of communicable diseases, including integration of HIV and respiratory care^{44,89-91}. Clear positive impacts on health worker morale have been documented in parallel qualitative evaluations, with non-physician clinicians reporting a sense of empowerment and improved agency to manage patients^{92,93}. PACK has been introduced throughout South Africa, and precursors piloted in Malawi and Botswana^{94,95}. Since 2015 it has been made available globally through a partnership with the British Medical Journal. More than 90% of the 2614 recommendations in the PACK Guide are linked to the BMJ's evidence product Best Practice and to more than 170 WHO guidelines to ensure it is kept in line with latest evidence and policy. A global update is published annually and is available at pack.bmj.com. The University of Cape Town Knowledge Translation Unit is also working with the BMJ to spread PACK to the many countries requesting it using a mentorship model to equip local country teams to successfully localise the clinical decision support tool and support active implementation. Work is currently underway in Brazil, Nigeria, India and China. A paediatric version (0-13

years) is currently being piloted, and adolescent content and community health worker content is in development. The aim is to provide frontline health workers in LMICs with consistent, quality clinical decision support integrated across the life course, multi-morbidities and levels of primary health care. To find out more about PACK visit www.knowledgetranslation.uct.ac.za

In practice the integration of treatment and care for people with different chronic mental disorders and concurrent physical disorders will depend upon the specific and pragmatic options available. Several projects have investigated integrated care in LMICS, including: mWellCare (<https://clinicaltrials.gov/ct2/show/NCT02480062>); and LatinMH⁹⁶. As one example, integrated care for people with severe mental illness can entail bringing medical services to the psychiatric hospital, as has taken place in Rwanda, where HIV services were integrated into psychiatric care at the tertiary (hospital) level, enabling patients to receive testing and treatment in the hospital and also to return for psychiatric care and HIV care during outpatient visits based at the hospital's clinic. Conversely, integrated care may mean supporting staff in primary health care clinics to gain the clinical skills and confidence to treat mental illnesses among the clinical cases treated, such as in clinics in the North West Province of South Africa within the COBALT and PRIME trials^{80,81} (see Figure 3). In each case the practicalities of integrating care within LMICs will need to align with the policy priorities of each province or state or country, and operate within the logistical constraints of what it is possible to do on the ground with the available resources. Further, many women seeking care for chronic conditions will either also require family planning or antenatal care. In many fragile health systems family planning services represent islands of organised care delivery within otherwise chaotic services, making them a very attractive entry point on which to build and strengthen integrated care.

(Figure 3 about here)

Conclusions

This paper has presented the results of a conceptual overview and a narrative review of integrated care for people with chronic mental disorders and comorbid chronic physical

conditions, examined the evidence that this approach produces benefit, identified barriers that limit such implementation, and proposed actions to better integrate care in future, particularly in LMICs. We have indicated that such changes are not trivial, and may require fundamentally restructuring health care provision that in many countries is mainly organised to respond to acute, single conditions.

Yet the lessons from studies in HIC may not translate readily to LMICs. The ICCCF and similar approaches often propose a ‘pyramid of care’, starting with self and family and community care, where the value of this level of health support has not been investigated in LMICs. Indeed in many LMICs any form of self-help or peer-support groups in mental health are poorly developed^{97,98}. Within LMICs it is also not yet clear whether primary and community care health personnel are sufficiently prepared and supported to be trained to adopt a different role, becoming competent both for the treatment of people with long term physical and mental conditions.

What is needed is workforce preparedness for integrated mental health care and diversification of roles that includes not only clinical skills training such as PACK, but also non-clinical skills that include communication skills necessary to probe for emotional problems, as well as emotional coping skills given that dealing with mental health problems requires emotional labour on the part of service providers. In addition to training, ongoing supervision and support from mental health specialists is needed for front-line staff who are being asked to help identify and manage individuals with serious mental health and substance use problems in primary care and other general health care settings.

Poor mental health literacy and stigma, and fear of being overwhelmed by clinical challenges that workers are not prepared for, may be a limiting factor in the uptake of such training^{99,100}. The implementation of integrated care needs a long term commitment to service reconfiguration, ongoing staff training, and other logistical redesign, including continuing medication supply, alongside a re-orientation to person-centred care that promotes empowered activated patients as well as household participation in care decisions that support self-management. We therefore recommend

that integrated care models are subjected to rigorous testing and strong process evaluation in LMICs that interrogates the system level interventions needed to support integrated care in LMIC contexts.

The wider policy context is that underlying this whole integrated care approach at the macro level is the recognition of two fundamental elements: that mental disorders are in fact non-communicable diseases, and that the treatment of people with mental disorders is an indivisible constituent of universal health coverage. The recent United Nations Sustainable Development Goals clearly support both these positions¹⁰¹⁻¹⁰³, and also the necessity of clearly including the provision of mental health care within national level policies mandating Universal Health Coverage.

One of the greatest barriers to the provision of integrated care is that with every additional condition identified, clinical guidelines tend to add a whole menu of essential assessments, advice and treatments. When these are added up, health providers can feel overwhelmed and not know what to prioritise. More guidelines or clinical decision-making tools should be considering prioritisation exercises to assist healthcare providers in making more evidence-aligned choices regarding what to focus on, as well as patients' expectations, needs and priorities. This has been described as asking the patient 'What matters to you?' rather than 'What's the matter with you?'¹⁰⁴ Ultimately such a process involves some uncomfortable trade-offs. If a patient presents with HIV, hypertension and depression, the most important first thing to do may be to prescribe anti-retrovirals and ensure that their viral load is suppressed first, before moving to control their blood pressure and address their symptoms of depression¹⁰⁵. Such decisions are difficult, especially where clinical specialists, donors and advocates tend to lobby for 'vertical' services for single conditions. A particular area that requires further understanding and evidence-based practice concerns the integrated care of people with co-occurring mental illness and substance use disorders (sometimes called 'dual diagnosis'). This particular combination of co-occurring conditions has long been recognised, and can complicate the treatment of both mental illness and the SUD¹¹. Yet there is not strong evidence that effective, integrated interventions have been identified. A narrative review comparing the effectiveness of integrated and non-integrated approaches found a lack of evidence

on the superiority of integratio¹¹². Similarly, a more recent Cochrane review of psychosocial interventions for people with both severe mental illness and substance misuse identified 32 trials, but found no significant additional benefit in outcomes from adding psychosocial treatments¹¹³. At present therefore there is not a strong enough evidence based to guide integrated care for this group of people.

The implications of this review are two-fold: (i) there is a clear need for high quality, evaluation studies of integrated care in LMICs, and (ii) health system strengthening measures are required for the success of the integrated care model, both in high income countries (HICs) as well in in LMICs. There is also now the potential for reverse innovation – with lessons generated through having to make services more comprehensive within the context of LMICs being translated back into HICs. This is especially the case where HICs experience austerity and budget reductions, or substantial increases in referrals for example from historically underserved populations such as refugees or individuals living in rural areas with little access to mental health speciality care. In such situations, there may be valuable lessons in terms of task-sharing and expanding service provision by non-specialist providers to be back-translated from LMICs to HICs.

Contributors

Graham Thornicroft, Daniel Chisholm, Pamela Y. Collins, Unaiza Niaz, Vicky Ngo, Vikram Patel, Martin Prince, Jürgen Unützer, and Huang Yueqin were involved in the original conception of this paper. Shalini Ahuja, Sumaiyah Docrat, Heidi Lempp, and Maya Semrau conducted the systematic review. All authors were directly involved in the writing, editing and finalisation of this paper.

Declaration of interests

The authors have no interests to declare

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Panel: Search strategy and selection criteria

References for this review were identified through searches of Medline, Embase and PsycInfo using (terms describing chronic care or integrated care models) and (terms describing long-term mental health conditions or multiple chronic conditions) and (terms describing evaluation or research etc.) and (terms describing LMICs or developing countries), from inception to February 2017. The full search strategies used are described in the appendix. Further literature was searched for, including grey literature (e.g. books and non data-based papers), by: (i) hand-searching reference lists (for example in relevant reviews or journal papers); (ii) a snowballing process of contacting experts active in the area; and (iii) searching the internet (through Google and Google Scholar search engines, relevant organizational websites, and key journals). Articles resulting from these searches were reviewed. The inclusion criteria were any publication that provided either a descriptive or evaluative component, from an LMIC, and written in English. Excluded papers did not provide either a descriptive or scientific evaluative component, were from high-income countries, focused on chronic physical conditions, were in languages other than English, or were conference abstracts.

Table 1. Components of WHO Innovative Care for Chronic Conditions (ICCCCF) Framework and actions needed for implementation

ICCCF Component	Implementation Actions ^{19,34}
Policy and population level (macro)	
1. Support a paradigm shift: change from acute, episodic model of care to focus on chronic conditions	<ul style="list-style-type: none"> • Analysis of and presentation to key decision-makers at national and state level regarding the burden, determinants and multi-morbidity of chronic conditions, together with policies and plans for their prevention and control • Synthesis of policy level changes at country level during the project period which will demonstrate to what extent the paradigm has shifted • Review of differences in the process between countries depending on the different starting points with regards to adoption of chronic care model • Include an emphasis on prevention
2. Manage the political environment	<ul style="list-style-type: none"> • Identify, engage share knowledge and build consensus between stakeholders, including policy makers, planners, health care leaders, patients, households, and community members • Create a national and state level platform for advocating improvement in chronic care service delivery • Undertake stakeholder analysis (including values, interests and scope of each group), joint annual planning
3. Align sectoral policies for health	<ul style="list-style-type: none"> • Align health care with labour practices (e.g. health and safety at work), agricultural regulations (e.g. pesticide use), and other legislative frameworks • Presentation to key decision-makers at national and state levels on policies of health and non-health sectors with impact on chronic diseases • Identify key roles of ministries and other private stakeholders in the prevention and control of NCDs and other chronic diseases • Assess feasibility, prioritisation and mechanisms of inter-sectoral collaboration
Facility level (meso)	
4. Build integrated health care	<ul style="list-style-type: none"> • Establish a vision, culture and appetite for integrated care among health providers and patients • Establish collaborative care teams at the facility for implementation of chronic disease programmes • Train, supervise and support human resources to provide care for chronic conditions • Design and implement processes related to medication supply, and other enabling processes to ensure that clinical processes are delivered effectively • Identify Chronic Care Champions at facilities and at regional/district level in the Department of Health Services providing stewardship and governance • Design and implement processes for prioritised cross-screening and cross-referrals among various units of health care provision. • Build integrated clinical information systems • Adopt a phased approach (develop a Theory of Change, then carry out a pilot phase using quality improvements methods in one or two facilities, and roll out to district.
5. Empower health care providers more effectively	<ul style="list-style-type: none"> • Implement team care models of care • Orientate primary health care (PHC) staff to case manager role and provide clear ceilings of accountability emphasising that it is not their role to provide all care for every patient • Orientate PHC staff with communication skills for person centred care • Capacitate PHC staff in counselling skills needed to facilitate diagnosis of mental health conditions and address lifestyle risks • Capacitate PHC practitioners in use of integrated chronic care

	<p>guidelines/clinical decision support tools such as PACK</p> <ul style="list-style-type: none"> • Capacitate quality improvement mentors at district and facility levels • Orientate and capacitate specialists to provide ongoing training and supportive supervision within a task sharing approach • Introduce clinical case conferences among the primary health care workers to promote a non-judgmental community of practice where successes, and failures, can be shared. • Incorporate integrated care indicators into performance appraisal and quality assurance mechanisms • Provide programmes to assist with burn-out and emotional labour • Capacitate leadership to act as champions for chronic care
Individual, household and local community level (micro)	
6. Support patients in their communities	<ul style="list-style-type: none"> • Extend care and support beyond the clinic (home, work, community) • Make use of information systems to remind health workers and patients about care plans • Identification of existing community support to patients • Acknowledging community people who provide support to patients. • Creating a network of community supporters of patients • Follow-up community support is essential to promote patient self-management and trace non-adherent patients. • Support the establishment of support groups in the community • Raise awareness of chronic conditions in through public health awareness campaigns
7. Centre care on person, family and household	<ul style="list-style-type: none"> • Patient's central role re lifestyle and daily behaviour change • Passive to active patient • Re-orientate care to needs of patient and household to improve treatment adherence • Develop self-management skills and treat emotional distress • Address whole needs of patients whether physical, mental or social • Include knowledge, values and aims of patients in decision-making process • Self-management support and joint decision making support • Use of information technology based monitoring systems to identify patients' needs, plan care over time, monitoring responses to treatment, and assess health outcomes • Participatory workshops for patient groups on self-management skills. • Continuous patients and care givers engagement model needs to be developed and sustained. • Capacitate health providers with clinical communication skills and motivational interviewing skills as in ICCCF to promote patient self-management • At the local community level capacitate outreach teams or community health workers to provide adherence support as well as establish support groups.
8. Emphasize prevention	<ul style="list-style-type: none"> • Activities to prevent onset and complications of chronic conditions e.g. early detection, increased physical activity, reduce tobacco use • Prevention focus: re-orientate reactive to proactive health care • Health education to patients attending facilities and to general population • Radio drama about ways to prevent NCDs and other chronic diseases • Use of social media and public events for the promotion of healthy lifestyles • Health educational talks and material can be provided at the facility level in the clinics as well as in the community through community health workers

Figure 1. Shared determinants, interactions and consequences of long term mental and physical conditions

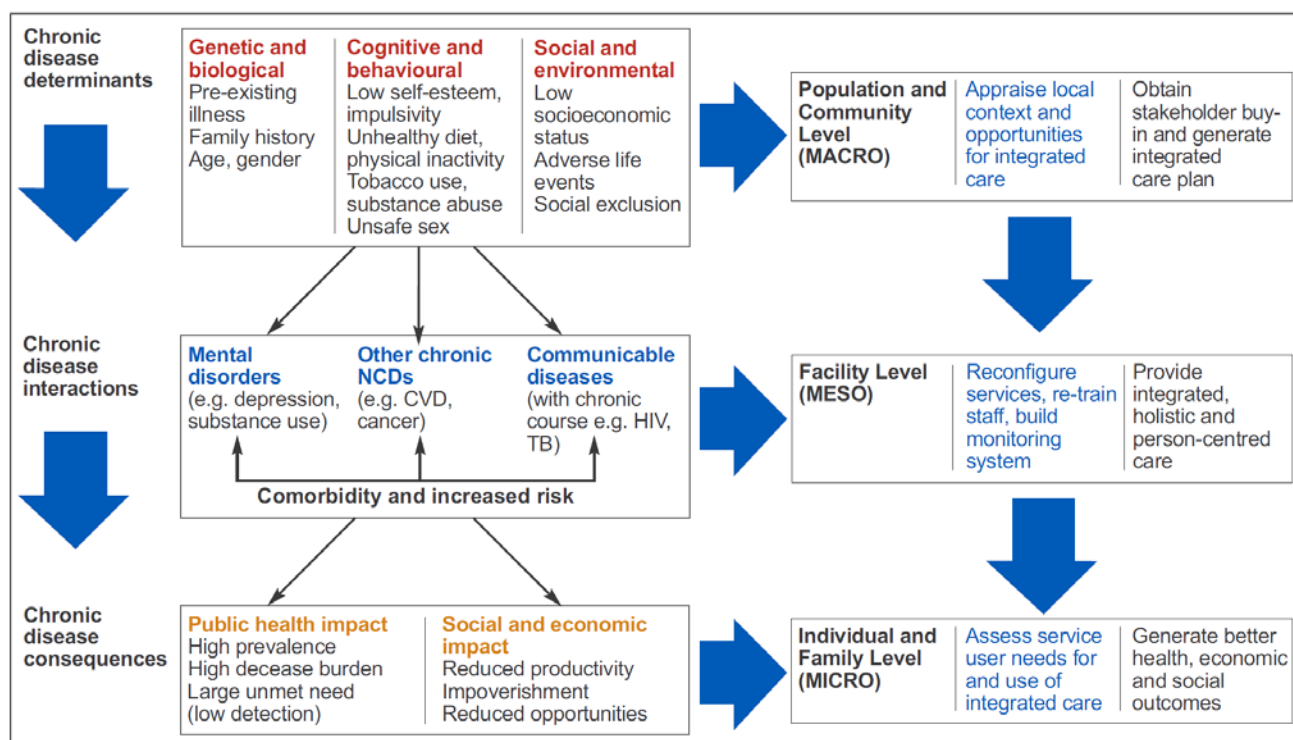


Figure 2. Flow chart showing the step-wise results of the literature search procedure

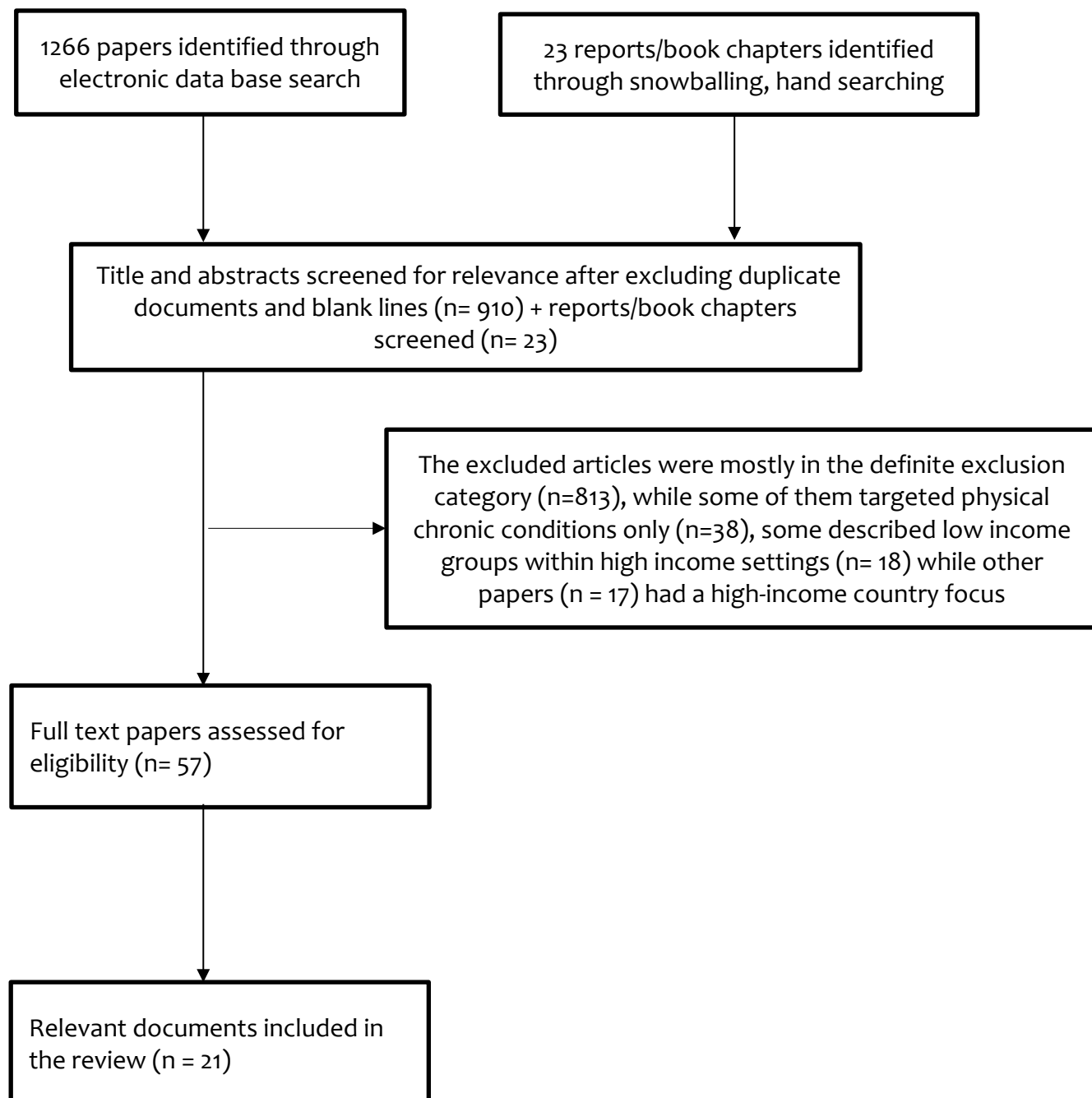


Figure 3. Training primary care staff in integrated care in North West Province, South Africa

(uploaded as a separate file)

Source: Graham Thornicroft

Web Appendix 1. Literature review method

The literature review inclusion criteria were as follows: (i) Any publication that provided either a description or an evaluation of either the chronic care model, ICCCF model or integrated health care for chronic / long-term physical conditions and mental disorders. While we initially aimed to only include papers with an evaluative component, due to the scarcity, we decided to also include those that were descriptive in nature. (ii) Only papers referring to LMICs were included. (iii) Research articles in English only were included. Exclusion criteria were: (i) Research papers that did not provide either a description or a scientific evaluation for either the chronic care model, ICCCF model or for integrated health care for chronic / long-term physical conditions and mental disorders. (ii) Papers referring only to high-income countries. (iii) Papers with a primary focus on chronic physical conditions. (iv) Conference abstracts. The search terms are given in Web Appendix 2.

The review process consisted of the following steps: (i) four researchers carried out the review, and three search engines were accessed, Medline, Embase and PsycInfo, using (terms describing chronic care or integrated care models) and (terms describing long-term mental health conditions or multiple chronic conditions) and (terms describing evaluation or research etc.) and (terms describing LMICs or developing countries), from inception to February 2017. The full search strategies used are described in the Web Appendix 3 (ii) Papers, book chapters and programme documents were assessed for inclusion, first through title and abstract screening, and subsequently through a full text review of those papers where relevance could not be established from the title or abstract, using the PRISMA checklist⁴⁵. This assessment was divided among two pairs of researchers. Where there was disagreement between the reviewers during full-text review, the decision of whether to include the report was independently made by a third researcher. (iii) Further literature was searched for, including grey literature (e.g. books and non data-based papers), by hand-searching reference lists (for example in relevant reviews or journal papers); by using a snowballing process of contacting experts in the topic area; and by searching the internet (through Google and Google Scholar search engines, relevant organizational websites, and key journals). Two researchers reached consensus on whether resources identified from the grey literature were eligible for inclusion. (iv) Prior to commencement, a data extraction form was designed for use in the review. The inclusion criteria were any publication that provided either a descriptive or evaluative component, from an LMIC, written in English, referring to both severe mental illness and a comorbid chronic physical condition. Excluded papers did not provide either a descriptive or scientific evaluative component, were from high-income countries, focused on chronic physical conditions, were in languages other than English, or were conference abstracts.

To quality assess the papers, for the quantitative studies, the quality assessment tool developed by Effective Public Health Practice Project (EPHPP)⁶⁷, and for qualitative studies a twelve point review criteria^{106,107} were used. From these ratings, each study was given a global rating of ‘weak’, ‘moderate’ or ‘strong’ evidence.

Web Appendix 2. Studies included in the narrative review

Anderson DA, Horton C, O'Toole MI, Brownson CA, Fazzone P, Fisher EB. Integrating depression care with diabetes care in real-world settings: lessons from the Robert Wood Johnson Foundation Diabetes Initiative. *Diabetes Spectr* 2007; 20: 10–16.

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Web Appendix 3. Search strategy and selection criteria for the narrative review

Key concepts for database search

Chronic care model OR ICCCF model OR integrated health care

AND

Long-term mental health conditions OR (one OR more chronic conditions)

AND

Evaluation OR research OR evidence OR study OR evaluation OR cross-sectional OR cohort OR RCT OR randomised controlled trial OR case-control OR quasi-experimental OR qualitative etc.

AND

LMICs OR Developing countries

Databases searched

Medline*, Embase*, PsycInfo*,

Mesh words: Medline

1. Chronic / ICCCF model

(exp Delivery of health care, integrated/ OR exp Integrated health care systems/ OR exp integrated health care model/ OR exp health care delivery models) OR

("chronic care model" OR "innovative care for chronic conditions framework" OR "ICCCF") OR

((integrated) AND (health care OR care OR services OR interventions))

integrated health care models or health care delivery models for chronic care

2. Long-term mental disorders

(exp Chronic disease/ OR exp Comorbidity/ OR Multimorbidity/ OR Mental health/ OR exp Mental Disorders/) OR

((Mental) AND (disorder* OR illness OR health OR health condition OR distress OR disease)) OR "psychological distress" OR "psychiatric disorder" OR

((chronic OR long-term OR life-long) AND (disorder* OR illness OR health OR health condition OR distress OR disease)) OR

(multiple AND (comorbi* OR morbidit*)) OR

((("mental confusion*") OR ("mental disability*") OR ("mental capacity*") OR

((psychiatric OR mental) AND (comorbidity OR comorbid)) OR psychiatry OR psychology) OR

("drug abuse" OR "drug addict*" OR "drug depend* *" OR "drug dependence*" OR "drug withdrawal" OR "drug abuse") OR

("addictive disease*" OR "addictive disorder*") OR

("alcoholic patient*" OR "alcoholic subject*" OR alcoholism OR "alcohol dependent*" OR "alcohol dependence*" OR "fetal alcohol*" OR "prenatal alcohol*" OR "chronic

ethanol*" OR "chronic* alcohol*" OR "alcohol withdrawal" OR "ethanol withdrawal") OR
 ("caffeine dependent*" OR "caffeine dependence" OR "caffeine addiction" OR
 (caffeine AND addict*) OR "caffeine withdrawal") OR
 ((cocaine OR heroin OR cannabis OR mdma OR ecstasy OR morphine*) AND (abuse
 OR depend* OR dependent* OR dependence* OR addict* OR addicts OR addicted OR
 addiction* OR withdrawal) OR methadone) OR
 (addiction OR addictive OR "substance abuse" OR "withdrawal syndrome" OR
 psychoactive*) OR
 ((schizophrenia OR schizophrenic) OR Schizotyp* OR ((Delusional OR paranoid) AND
 disorder*) OR hallucination* OR Psychotic OR Schizoaffective OR psychosis) OR
 (((manic OR bipolar OR mood) AND disorder*) OR (depressive AND (disorder* OR
 episode*)) OR "depressive symptom*" OR hypomania OR mania* OR ((major OR
 psychotic OR disorder*) AND depression) OR "suicide attempt*" OR suicidal* OR
 cyclothymia OR Dysthymia) OR
 (((anxiety OR panic OR "Obsessive-compulsive" OR adjustment OR conversion OR
 dissociative OR Somatoform OR Somatization OR neurotic) AND disorder*) OR
 ("hypochondriasis*" OR "body dysmorphic disorder*" OR "pain disorder*") OR
 agoraphobia OR "social phobia*" OR "Post-traumatic stress" OR "stress disorder*") OR
 ("Eating disorder*" OR "Anorexia nervosa" OR "Bulimia nervosa" OR "sleep disturbance"
 OR (sexual AND (disorder* OR dysfunction)) OR ((postnatal OR postpartum) AND
 depression) OR ((antidepressant* OR
 laxative* OR analgesic* OR psychotropic* OR vitamin* OR steroids OR hormone*) AND
 abuse) OR
 ((insomnia OR sleepiness OR "sleep disturbance") NOT (apnea OR "side effect*" OR
 parkinson* OR alzheimer OR neurodegenerat* OR cancer OR obesity OR obese*)) OR
 (hypersomnia NOT narcolepsy) OR ((sleep OR night) AND terror*) OR nightmare* OR
 ((disorder* AND (personality OR identity OR impulse* OR impulsive* OR impulsivity)) OR
 asocial OR antisocial OR psychopathic OR anxious OR narcissi* OR "Pathological
 gambling" OR pyromania* OR Trichotillomania OR Psychosexual OR ("Munchausen
 syndrome")) OR
 ("Pervasive developmental disorder*" OR autism OR autistic* OR "Rett* syndrome" OR
 "Asperger* syndrome") OR
 ((Hyperkinetic OR Conduct OR Emotional OR tic) AND disorder*) OR (anxiety AND
 (separation OR phobic OR social)) OR (hyperactivity AND (disorder* OR syndrome)) OR
 "Tourette syndrome" OR "Tourette's syndrome") OR
 (Nervousness OR "nervous tension" OR Irritability) OR anorexia OR (neurosis OR
 neuroses OR psychoses)

3. exp Cardiovascular Diseases/ or cardio*.tw. or cardia*.tw. or heart*.tw. or
 coronary*.tw. or angina*.tw. or ventric*.tw. or myocard*.tw. or pericard*.tw. or
 isch?em*.tw. or emboli*.tw. or arrhythmi*.tw. or thrombo*.tw. or atrial fibrillat*.tw. or
 tachycardi*.tw. or endocardi*.tw. or (sick adj sinus).tw. or exp Stroke/ or (stroke or
 stokes).tw. or cerebrovasc*.tw. or cerebral vascular.tw. or apoplexy.tw. or (brain adj2
 accident*).tw. or ((brain* or cerebral or lacunar) adj2 infarct*).tw. or exp Hypertension/
 or hypertensi*.tw. or peripheral arter* disease*.tw. or ((high or increased or elevated)
 adj2 blood pressure).tw. or exp Hyperlipidemias/ or hyperlipid*.tw. or hyperlip?emia*.tw.

or hypercholesterol*.tw. or hypercholester?emia*.tw. or hyperlipoprotein?emia*.tw. or hypertriglycerid?emia*.tw.

4. exp Asthma/ or asthma\$.mp. or (antiasthma\$ or antiasthma\$).mp. or Respiratory Sounds.mp. or wheez\$.mp. or Bronchial Spasm.mp. or bronchospas\$.mp. or (bronch\$ adj3 spasm\$).mp. or bronchoconstrict\$.mp. or exp Bronchoconstriction/ or (bronch\$ adj3 constrict\$).mp. or Bronchial Hyperreactivity/ or Respiratory Hypersensitivity/ or ((bronchial\$ or respiratory or airway\$ or lung\$) adj3 (hypersensitiv\$ or hyperreactiv\$ or allerg\$ or insufficiency)).mp. or ((dust or mite\$) adj3 (allerg\$ or hypersensitiv\$)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]

5. exp Diabetes Mellitus/ or exp Diabetes Complications/ or diabet\$.mp. or (IDDM or NIDDM or MODY or T1DM or T2DM).mp. or ((typ? 1 or typ? 2 or typ?1 or typ?2) adj diabet\$).mp. or ((typ? I or typ? II or typ?I or typ?II) adj diabet\$).mp. or (diabet\$ adj (typ? 1 or typ? 2 or typ?1 or typ?2)).mp. or (diabet\$ adj (typ? I or typ? II or typ?I or typ?II)).mp. or (non-insulin\$ depend\$ or noninsulin\$ depend\$ or non insulin?depend\$ or noninsulin?depend\$).mp. or (insulin\$ depend\$ or insulin?depend\$).mp. or (late onset adj6 diabet\$).mp. or (maturity onset adj6 diabet\$).mp. or (juvenile adj6 diabet\$).mp

OR

exp Diabetes Insipidus/ or diabet\$ insipidus.mp.

6. exp Lung Neoplasms/ OR exp Carcinoma, Non-Small-Cell Lung/ OR (lung\$ adj3 canc\$).mp. OR (lung\$ adj3 carcinoma\$).mp. OR (lung\$ adj3 tumor\$).mp. OR (lung\$ adj3 neoplasm\$).mp.

7. ((prevent\$ or delay\$ or reduc\$) adj5 (dement\$ or alzheimer\$ or (cognit\$ adj3 impair\$))).mp.

OR ((cognit\$ or memory\$ or mental\$ or cerebral or "mild cognitive function" or mci or "brain activity") adj4 (improv\$ or enhanc\$ or perform\$ or process\$)).mp. OR (((prevent\$ adj3 los\$) or (prevent\$ adj3 deteriorat\$)) and ((cognit\$ adj3 declin\$) or (cognit\$ adj3 deficit\$))).mp. OR dement\$.mp. OR alzheimer\$.mp. OR lewy\$ bod\$.mp. OR deliri\$.mp. OR ((cognit\$ or memory\$ or mental\$) adj5 (declin\$ or impair\$ or los\$ or deteriorat\$)).mp. OR (chronic adj4 cerebrovascular).mp. OR ("organic brain disease" or "organic brain syndrome").mp. OR ("supra nuclear palsy" or "ischemic white matter" or "multiple infarcts").mp. OR ("normal pressure hydrocephalus" and shunt\$).mp. OR "benign senescent forgetfulness".mp. OR (cerebr\$ adj3 deteriorat\$).mp. OR (cerebr\$ adj3 insufficien\$).mp. OR (confusion\$ or confused).mp. OR (pick\$ adj2 disease).mp. OR (creutzfeldt or JCD or CJD).mp. OR huntington\$.mp. OR binswanger\$.mp. OR korsako\$.mp. OR "creutzfeldt-jakob-disease"/ OR exp dementia/ OR exp frontal variant dementia/ OR exp frontotemporal dementia/ OR exp "mixed depression and dementia"/ OR exp multiinfarct dementia/ OR exp Pick presenile dementia/ OR exp presenile dementia/ OR exp semantic dementia/ OR exp senile dementia/ OR exp Alzheimer disease/ OR exp Lewy body/ OR Huntington disease like syndrome/ or exp Huntington

chorea/ OR exp mental deterioration/ OR exp Wernicke encephalopathy/ OR exp Wernicke Korsakoff syndrome/ OR exp Binswanger encephalopathy/ OR transient ischemic attack/ OR exp Korsakoff psychosis/ OR exp organic brain syndrome/ OR exp progressive supranuclear palsy/ OR exp CADASIL/ OR cerebrovascular disease/ OR traumatic brain injury/ OR exp delirium/ OR cognitive defect/ OR exp mild cognitive impairment/ OR "Parkinson* disease dementia".mp. OR PDD.mp. OR (aMCI or MCI).mp. OR ("AA CD" or AACD or "CI ND" or CIND or SMC or "AA MI" or AAMI or LCD or QD or ARCD or MCD or MNCD or "N-MCI" or "M-MCI").mp. OR ("limited cognitive disturbance*" or "mild cognitive disorder*").mp.

8. (Afghan* or Albania* or Algeria* or Samoa* or Angola* or Antigua* or Barbuda* or Aruba or Aruban* or Argentina* or Armenia* or Azerbaijan* or Bahrain* or Bangladesh* or Belarus* or Beliz* or Benin* or Bhutan* or Bolivia* or Bosnia* or Herzegovin* or Botswana* or Brazil* or Bulgaria* or Burkina Faso or Burundi* or Cambodia* or Cameroon* or Cabo Verd* or Cape Verd* or Central African Republic or Chad* or Chile* or China or Chinese or Colombia* or Comoros or Comorian or Congo* or Cote d'Ivoire or Ivory Coast or Costa Rica* or Croatia* or Cuba or Cuban or Cyprus or Cypriot* or Czech* or Dominica* or Djibouti* or Ecuador* or Egypt* or El Salvador* or Eritrea* or Estonia* or Ethiopia* or Fiji or Gabon* or Gambia* or Gaza* or Georgia* or Ghana* or Gibraltar* or Greece or Greek or Grenad* or Guam or Chamorro* or Chamoru or Guatemala* or Guinea* or Guyana* or Haiti* or Hondura* or Hungar* or India* or Indonesia* or Iran* or Iraq* or Isle of Man or Mann or Manx or Jamaica* or Jordan* or Kazakh* or Kenya* or Kiribati* or Korea* or Kosovo* or Kyrgyz* or Lao* or Latvia* or Leban* or Lesotho* or Liberia* or Libya* or Liechtenstein or Lithuania* or Macao or Macau or Macanese or Macedonia* or Madagasca* or Malawi* or Malay* or Maldiv* or Mali or Marshall Island* or Maurit* or Mexic* or Micronesia* or Moldova* or Mongolia* or Montenegr* or Morocc* or Mozambi* or Myanm* or Burm* Namibia* or Nepal* or New Caledonia* or Nicaragua* or Niger* or Pakistan* or Palau* or Panam* or Paraguay* or Peru* or Philippin* or Filipin* or Poland or Polish or Portug* or Puerto Ric* or Romania* or Russia* or Rwand* or Samoa* or Sao Tome* or Principe or Saudi Arab* or Senegal* or Serbia* or Seychell* or Sierra Leone* or Slovak* or Slovenia* or Solomon* or Somalia* or South Africa* or Sri Lanka* or Kitts or Nevis or Lucia* or Vincent or Grenadines or Sudan* or Surinam* or Swazi* or Syria* or Tajikistan* or Tanzania* or Thai* or Timor* or Togo* or Tonga* or Trinidad* or Tobag* or Tunisia* or Turkey or Turkish or Turkmen* or Tuvalu* or Uganda* or Ukrain* or Uruguay* or Uzbekistan* Vanuatu* or Venezuela* or Vietnam* or Yemen* or Zambia* or Zimbabwe* or Sub-Sahara* or Sahara* or Africa* or SSA or Asia* or Pacific or South America* or Latin America* or Central America* or East Europe* or Eastern Europe* or LIC or LICs or LAMIC or LAMICs or LMIC or LMICs or MIC or MICs or UMIC or UMICs).ab,ti.

Preliminary search results:

1 AND [2 AND (3or 4 or 5 or 6 or 7)] AND 8

Web Appendix 4. Review studies included on effectiveness of chronic care models in LMICs

Paper Number	Authors	Country focus	Study design	Participants	Area of integration	Type of evaluation of chronic care models (if any)	Type of data collected	Outcomes	Quality
1.	Anderson et al (2015)	Ethnic minority population in the high-income settings	Nine community sites used the PHQ-9, a short version of the Patient Health Questionnaire, as a screening tool for depression in all diabetic patients enrolled	Community sites included	Enhancement of primary care and integration of mental health services with diabetes	No evaluation reported	Mixed (models of treatment developed by the projects, quantitative description of screening results)	Patients with diabetes from underserved and ethnic minority populations have higher rates of comorbid depression. Ongoing programs at Diabetes Initiative sites provide models demonstrating that integrated care can be implemented in real-world settings.	Weak
2.	De Menil et al (2015)	Rural Kenya (LMIC)	Cost-effective analysis (using a pre-post design)	117 (service users) consecutively enrolled participants with schizophrenia-spectrum and bipolar disorders were followed-up at 10 and 20 months	Mental health integrated with sustainable livelihood	Mental health and development package	Quantitative	a. MH and development achieves increasing return over time b. MHD reaches lowest socio-economic groups and appears to be cost effective both from societal and health system perspective c. Increase in the savings by average user-largely from return on productivity, substantial economic benefits to the users reported.	Moderate
3.	Hailemariam et al (2016)	Rural district, Ethiopia (LIC)	Formative qualitative study	21 (planners, users care givers, providers)	Integrating mental health with primary care	Formative evaluation	Qualitative	Equity- innovative approaches such as telephonic communications, psychiatric nurses-based outreach in nearby homes and towns need to be developed and evaluated for integrated mental health service delivery	Weak
4.	Hanlon et al (2014)	Ethiopia, India, Nepal, Uganda, South Africa	Situational analysis tool,	Largely relying upon information available in the public domain and supplemented by contact with key officials and service leads	Integrating mental health with primary care	No evaluation reported	Qualitative	Service delivery and enabling packages are integrated at primary care level in PRIME programme and are needed for integration of mental health at primary care. Formative work is needed to assess the possibility of integration. Process of quality improvement also empathised for evaluation.	Moderate

5.	Hanlon et al (2016)	Ethiopia, India, Nepal, Uganda, South Africa	Formative research - situational analysis tool, expert consultations	District level information included	Integrating mental health with primary care	No evaluation reported	Qualitative	District level mental health care packages in the five countries were developed through application of standardised participatory mixed methods approach. These approaches have not been utilised before and will be subjected to rigorous and comprehensive evaluation.	Weak
6	Hickling et al (2011)	Jamaica (UMIC)	Qualitative cross-sectional study (with 20 focus groups) and designed and implemented in 2005- 2006	159 participants (included patients and care givers and providers). All focus groups shared similar socio-demographic variables	Integration of mental health with primary care	No evaluation reported	Qualitative	Integration of community mental health with primary care have played non-stigmatising role, particularly through increased public interaction with mentally ill and by building awareness of MH services and their effectiveness through integration	Weak
7	Jenkins et al (2011)	Zanzibar (LI)	Qualitative study with situational appraisal, consultations, key informant interviews	Planners, policy makes, managers	Integrating mental health with primary care	No evaluation reported	Qualitative	Developing integrated MH care, HMIS integration is needed. It has proved difficult to generate MHH properly integrated into HMIS in other E African countries as well, encountering strong resistance from health sector reform terms tend to be dominated by communicable specialists	Weak
8	Jordans et al (2013)	Nepal (LIC)	Mixed methods design	26 participants (counsellors, psychologists, psychiatrists, nurses)	Integrating mental health with primary care	Formative evaluation: key informant interviews and expert consultations, ToC workshops	Qualitative and quantitative	Developing integrated MH care, HMIS integration is needed. It has proved difficult to generate MH information properly integrated into HMIS into the E African countries as well, encountering strong resistance from health sector reform terms tend to be dominated by communicable specialists.	Weak
9	Joska and Sorsdahl (2012)	Cape Town, S Africa (UMIC)	Review	NA	Integrating mental health with HIV	No evaluation reported	Qualitative	a. Inter-related processes between HIV and MD (mental disorders) suggest higher rates of comorbidity. b. Integrated models should be feasible and acceptable to the providers and managers of the facility. c. Clinics need to target active screening for those identified as being at risk of failure, out of 10 % at risk of failure half (50%) could be identified with MD. With such integrated	Weak

								models, individuals with critical need are helped near their place of residence	
10	Marques (2015)	Sao Paul, Brazil (UMIC)	review	Not applicable	Integrated bio-psychosocial treatment - Equilibrium programme	Case management model	Qualitative	Higher rates of psychiatric disorders in a sample of children and adolescents, living under social vulnerability Integrated case management system to ensure continuity of care	Weak
11	Mall et al (2017)	Cape Town, South Africa (UMIC)	Cross sectional-qualitative design	16 focus group discussion and 25 in-depth interviews (providers, service users, planners)	Integrating MH with primary care	Used ICCCF framework	Qualitative	<p>ICCCF framework to the best of their knowledge has not been applied previously or evaluated with respect to the care of SMDs in LMICs. Strategies used for planning long term care of people with SMDs</p> <p>Micro: Health facility triad in relation to poverty alleviation, adherence support, long term access to care, rehabilitation, reintegration and traditional healing</p> <p>Meso- Health care organisational changes are intimately linked to community participation</p> <p>Macro- Potential need for external resources to support poverty alleviation</p> <p>Acceptability, feasibility, effectiveness which can be evaluated as a part of PRIME programme</p>	Strong
12	Mendenhall et al (2014)	LMICs	Systematic review	48 published articles were analysed	Co-morbid depression among people with type 2 diabetes in LMICs	No evaluation reported	Quantitative	Evidence from 48 studies underscores the need for comprehensive mental health care that is integrated into the diabetes care within LMIC health systems. Cost of oversight of mental health problems among people within chronic illness in LMICs needs exploration.	Weak
13	McDaid et al (2014)	Examples from healthcare systems across globe	Book chapter	Not applicable	Multi-morbidities	Various economic evaluations reported	Qualitative and quantitative	Multi-morbidities pose substantial costs to healthcare systems and society as a whole, which can be avoided through early identification of potential risk factors to mitigate the effects of multi-morbidity.	Weak

14	Narayanan et al (2012)	India (UMIC)	Systematic review	NA	Integrating MH into cardiovascular diseases	Indicated but not evaluated	Qualitative	Routine screening of DD at different stages of illness (chronic physical illness) needed. Mixed methods studies needed for in-depth understanding of socio cultural context. Data pooling to come up with combined prevalence. Methods of integrating MH and CVD epidemiological research needed at the level of planning, institutional/policy level, educational level, clinical level, care giver/community level	Moderate
15	Oldenburg et al (2014)	Book chapter focuses on all countries (elements on LMICs)	Review	NA	NCDs with common mental disorders	No evaluation reported, talks about collaborative models	Qualitative	Shared determinants for NCDs and common mental disorders described. Collaborative care models with the up-skilling of nurses as case managers in providing continuity of care described. Economic impact of co-occurrence of NCDs and CMDs, especially long-term work absence and the associated costs needs to be researched	Weak
16	Patel et al (2008)	Karachi, Pakistan (LIC)	Cross sectional study-Self reported questionnaire for primary care physicians (2006)	56 primary care physicians with mean age of 40 with 68% males	Immunisation, screening of chronic conditions (including mental health), behavioural counselling, chemoprophylaxis	No evaluation reported	Quantitative	Higher screening reported for Diabetes Mellitus (92%) than hypercholesterolemia (73%), osteoporosis (46%), Depressive disorders (62%), Dementia (26%). Regular CME for doctors to update physicians on preventive care for chronic conditions reported. Integration of the recertification process for physicians emphasised	Weak
17	Petersen et al (2011)	South Africa (UMIC)	Review (Medline, Psych Info), review period (2009-2010)	Not applicable	Integrated package of care at primary level	Collaborative care models	Qualitative	Expanded focus from acute and symptomatic care of people with mental disorders to include "social dimension of care" emphasised. More evidence is required for determining resource mix required for integrated evidence-based packages of stepped care into local health care systems. Adoption of a decentralised stepped care approach embracing task shifting to non-specialists for those disorders for which it has been shown effective.	Moderate

18	Sartorius et al (2014)	Book chapter focuses on LMICs	Review	NA	NCDs and mental disorders	No evaluation reported, integrated care model	Qualitative	Health systems approached needed to evaluate the integration of NCDs with mental health include organization of the health system are documented they include, data collection, prevention, diagnostic tools and infrastructure, medicine procurement and supply, accessibility and affordability of medicines and care, healthcare workers, adherence issues, patient education and empowerment, community involvement and positive policy environment.	Weak
19	Semrau et al (2015)	LMICs	Review	NA	Integrating MH with primary care	No evaluation reported	Qualitative	New estimates of cost and impact of scaling up of interventions for Mental Neurological Substance abuse disorders needed to scale up integrated care Mixed methods baseline and end line assessment of impact of integrated care on health system in six LMICs to be evaluated as a part of the new (Emerald) project	Weak
20	Vera et al (2010)	Puerto Rico (UMIC)	Randomised Control Trials (RCT)	179 patients (primary care patients with major DD and chronic general medical condition) were randomly assigned to receive collaborative care or chronic care	DD (Depressive Disorders) with chronic general medical conditions	RCT as a means of evaluation of collaborative care models	Quantitative	CC significantly reduced depressive symptoms, improved social functioning within 6 months after randomization	Strong
21	Wesseling et al (2013)	Costa Rica (UMIC)	Cross sectional-quantitative design	401 screened subjects	Integrating mental and neurological conditions	No evaluation reported	Quantitative	Three tier screening approach (with their sensitivities and specificities) towards integrating mental health with neurological conditions is reported. Multidisciplinary team involvement (nurse, general physician and a neurologist) emphasised.	Weak

Web Appendix 5. Intended benefits of delivering mental health care within integrated care

Domain	Intended benefit	Means of delivery
Health service governance	<ul style="list-style-type: none"> • Improve health care decision making by policy makers and planners • Improve accountability of senior and middle managers of their impact on services 	<ul style="list-style-type: none"> • Provide feasible methods to assess health policy objectives related to co-ordination, implementation, numbers of staff, capability of managerial staff, locally applicable policies, integrated donor support, and extent of cross-ministerial working
Financing	<ul style="list-style-type: none"> • Clearer, dedicated resources for services for people with chronic conditions • Better integrated funding • Enhanced financial protection for persons with chronic conditions 	<ul style="list-style-type: none"> • Better co-ordinated donor funding with recognition of co-morbidity implications for e.g. HIV/AIDS treatment targets • Increased provision of social insurance • Inclusion of mental health treatment within Universal Health Coverage
Human resources	<ul style="list-style-type: none"> • More staff trained to identify and offer first line treatment for people with mental illnesses • Greater proportion of people with mental illnesses receive treatment (reduced treatment gap) • Training in line with best relevant evidence • More people receiving care for mental illness receive guideline concordant treatment (reduced effectiveness gap) • Less staff burnout and increased staff retention 	<ul style="list-style-type: none"> • Train generic primary care and community services staff in evidence based treatment (e.g. WHO mhGAP Intervention Guide) • Train more senior staff to provide ongoing supervision and support • Provide change management support to middle managers • Feedback of positive patient outcomes reduces improves staff morale and reduces staff turnover
Service delivery	<ul style="list-style-type: none"> • Better quality continuing of care for people with chronic conditions • Better informed and engaged patients and family members⁹⁸ • More active participation of patients and family members in treatment decisions 	<ul style="list-style-type: none"> • Create primary care teams dedicated to continuing care for people with chronic conditions with case manager roles • Organized approach to offering information to patient and family members about chronic conditions • Staff acceptance of a shared care • Introduction of self-management methods

		<ul style="list-style-type: none"> • Use of methods of continuous quality improvement suitable for LMIC settings • Service redesign to achieve ongoing supply of core medications
Stigma and discrimination	<ul style="list-style-type: none"> • Recognition by primary and community care staff that treatment of people with mental illnesses is part of ‘core business’¹⁰⁰ • Increased staff willingness to receive mental health training and to put this into practice 	<ul style="list-style-type: none"> • Adapt inter-personal contact methods to reduce stigma among primary and community care staff⁹⁹ • Supervision and support related to individual clinical cases to improve staff familiarity and confidence for mental health clinical tasks
Information systems	<ul style="list-style-type: none"> • Staff better supported with relevant information at point of contact with patients • Allow service monitoring and quality improvement 	<ul style="list-style-type: none"> • Make essential clinical information available to primary and community care staff at point of contact • Make these data available to health service managers and planners to allow appraisal of system performance via monitoring of health service targets/indicators

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